Objectives: Student will be able to:

**Key Terms:**

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| • aerobic respiration,  anaerobic respiration  • ATP  • carbon cycle  • chemosynthesis  • cellular respiration  • energy conversion: light,  chemical  • metabolism  • mitochondria and  chloroplasts  • photosynthesis  • prokaryotes and eukaryotes |
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Use evidence and science knowledge to construct scientific explanations, models, and representations.

Observe the internal structures of at least three different types of cells (such as amoeba, fungi, plant root, plant leaf, animal muscle, and animal skin).

Construct a representation that links the movement of matter (carbon molecule, water) and the transfer of energy through the process of photosynthesis.

Formulate a scientific question about the relationship between energy from the Sun and plant growth and health (number of leaves, number of flowers, color of leaves) Lab

Create a representation to describe the cycling of a carbon atom from the physical (abiotic) environment through the molecules of the biological (biotic) components of an ecosystem back to the physical (abiotic) environment.

Construct a graphical representation of the number of sugar

molecules that are broken down into carbon dioxide and the

amount of ATP that is produced during fermentation when

oxygen is limited and during cellular respiration when oxygen

is available.

Develop a plan to address the needs of humans living under

specific extreme conditions by researching and then creating a

man-made habitat.

Oxygen

Carbon Dioxide

Glucose

Sun

Light

Water

**6** **CO2 + 6 H2O C6H12O6 + 6O2**



Pertinent Information:

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| **“Big” Ideas** | As matter and energy flow through different levels of organization of living systems – cells, organs, organisms, communities – ***chemical elements are recombined in different ways to form different products.***  Through photosynthesis, plants take energy from light to form sugar molecules (high energy level) containing carbon, hydrogen, and oxygen from lower energy molecules.  These sugar molecules can be used to make amino acids and other carbon-containing molecules and assembled into larger molecules with biological activity.  Energy is transferred when the bonds of food molecules are broken and new compounds with lower energy are formed. Some of the energy is used to change ADP, (low energy), into ATP, an energy carrier that functions in a variety of pathways. |
| **Essential Question** | ***How can we illustrate the ways organisms obtain and use the matter and energy they need to live and grow?*** |
| **Enduring Understanding** | As matter and energy flow through different levels of organization of living systems – cells, organs, organisms, communities – chemical elements are recombined in different ways to form different products.  Carbon and oxygen move between organisms and the environment through the processes of photosynthesis and cellular respiration.  During photosynthesis, light energy is converted to chemical energy as carbon dioxide and water combine to form glucose and oxygen.  The energy stored in food is released as ATP during cellular respiration. |

Notes: